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USSR Report

CONSTRUCTION AND RELATED INDUSTRIES

No. 96

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2 September 1983

USSR REPORT
CONSTRUCTION AND RELATED INDUSTRIES

No. 96

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INDUSTRIAL CONSTRUCTION

ENTERPRISE RENOVATION, RETOOLING ADVOCATED OVER NEW CONSTRUCTION

Effectiveness of Enterprise Renovation

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 5, May 83 pp 40-48

[Article by V. Dubrovskiy, candidate of economic sciences: "Renovation of Enterprises: Reserves of Effectiveness"]

[Text] The decisions of the 26th CPSU Congress noted the necessity of changing the system of reproducing fixed capital which had taken shape; this was to be done in order to enhance the role of retooling and renovating existing enterprises. Now the construction of new and the expansion of existing enterprises will be carried out only in such cases where the needs of the national economy in the given type of product cannot be provided by means of improving the utilization of production capacities, taking into account their renovation and retooling.

The high degree of effectiveness of such investment trends consists in the fact that expenditures for replacing obsolete equipment and expanding the machinery stock, carried out with a minimum of the necessary work for re-structuring the production buildings and the engineering re-structuring of the enterprises, do not stagnate in unfinished construction, and they provide a rapid yield on investment, sharply curtailing the turnover of capital investments. Funds allocated for renovation and retooling, N. A. Tikhonov, chairman of the USSR Council of Ministers, emphasized in his report at the 26th Party Congress, pay for themselves an average of three times faster than in the case of creating analogous production capacities by means of new construction.*

Over the past few years we have accumulated a great deal of experience in retooling and renovation; a number of industrial sectors have attained a significant growth of capacities with minimal capital investments. However, the possibilities of these important modes of intensification are not being fully utilized. Analysis of the experience of retooling and renovation shows that not all the methodological and organizational problems have been solved in the necessary manner. In practice the body of work on the given reproductive forms has not been delineated. Moreover, at the present time

* See: "Materialy XXVI s"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, Politizdat, 1981, p 110.

when the problem has been posed of providing the fullest possible implementation of the advantages of intensified production, such delineation assumes top-priority importance. Frequently the decision to carry out renovation is made without a careful study of the possibilities for achieving the specified increase of capacities by means of a retooling of production. As a result, instead of refurbishing the enterprise with the most up-to-date equipment, a long, drawn-out capital construction is engaged in, frequently going beyond the normative deadlines and, as a rule, exceeding the framework of the initial estimated cost of the renovation plans.

Replacing obsolete and physically worn-out equipment--a basic element in the growing intensification of production--has emerged as the outstanding mark not only of retooling but also of renovation. The technical level of production is evaluated subjectively; therefore, during the course of renovation preference is not always given to replacing obsolete equipment, as opposed to building facilities which are not of top-priority importance, for example, administrative wings. Most likely, this also constitutes the principal reason why at the present time the proportion of funds being allocated to renovation without the construction of buildings and other structures, i.e., precisely for replacing obsolete equipment, expanding the machinery stock by means of more compact equipment, does not exceed 10 percent of the total amount of capital investments directed into renovation and expansion as a whole. When forming the sectorial plans for capital investments in order to intensify production, the ministries and the departments demand considerable funds, but they do not always utilize them effectively. The time has come about when what we need in the total outlays for intensifying production is to raise the priority of expenditures aimed at replacing obsolete and physically worn-out equipment. Consolidated calculations have shown that increasing the proportion of equipment within the amount of capital investments at the level of the national economy by only 1 percent leads to a growth of production output by 7--8 billion rubles. It makes sense to allocate such outlays individually, i.e., it is feasible to regard the replacement of obsolete equipment and the expansion of the machinery stock at these production areas as an object of special aims for capital investments, such as a retooling of existing enterprises and to exclude them from the body of operations on renovation. This measure would enable us to exercise monitoring controls over the renewal of the active portion of fixed capital and to increase, on the whole, the return on investment of the functioning production apparatus.

The existing concept of "renovation" does not encompass projects actually being carried out. The intensification of production has moved to the fore tasks which were formerly not taken into consideration in the plans for renovation. Thus, there is now greater attention being paid to the ecological problem, and expenditures for environmental protection have sharply increased. Their proportion is especially great in the plans for renovating enterprises in the metallurgical and chemical industries. For example, at the Kuznetskiy Metallurgical Combine imeni V. I. Lenin the outlays for protecting the air and water basins are provided in an amount equalling 20 percent of the entire cost of the project. Furthermore, in accordance with

the programs of the socio-economic development for big cities, their enterprises within the procedure of proportional participation are carrying out the construction of purification facilities, connecting roads, etc. Particular importance is being assumed by the social motives for renovation.

It is thought that we need a new classification of projects with respect to renovation, reflecting the actual capital consumption and more objectively evaluating its advantages as compared with new construction. The classification must take into consideration not only the reproductive nature of the outlays. Renovation presupposes a national-economic approach to the outlays being planned; this requires a determination of their effectiveness both from the point of view of the enterprise to be renovated and proceeding from the interests of the sector and the territorial-industrial complex as a whole. Consequently, to evaluate a renovation merely by comparing the specific capital investments with the analogous indicators of new construction is insufficient, particularly in those sectors where the prices on new equipment are growing faster than its productivity. Nor is this always correct for the reason that frequently consideration is not given to the uniquely individual motive for renovation. It is undoubtedly true that such comparisons are necessary, but in regarding them as the principal and universal criterion for adopting a final decision (renovation or new construction) care is required. There are quite a few situations where the traditional concepts of the effectiveness of renovation oversimplify the problem of evaluating it.

Characteristic in this regard is the example of the development of the Ural economic region, where a considerable number of old metallurgical plants are located. For the future quite a few of them are confronted with the following question: should they carry out a radical renovation or a liquidation? There are quite a few advocates of liquidation. However, with the tight balance of labor resources, particularly in the country's eastern regions, the liquidation of plants would require the re-training of many thousands of workers, the solution of new problems as to their job placement and accordingly quite extensive outlays. Therefore, taking into account the preference for an already created infrastructure, the formation of which under the conditions of the Urals and Siberia is fraught with great difficulties, inasmuch as it requires traditionally considerable pioneering outlays, the specialists of Uralgiprommez provided good grounds for the necessity of retaining most of the old Urals plants for the purpose of renovating them radically. The Main Administration of the State Experts of USSR Gosstroy approved and supported the proposal by the Uralgiprommez. The effectiveness of the plan for such a large-scale program was determined. According to the preliminary estimates, renovation of these enterprises will allow us to increase labor productivity and reimburse the proposed outlays during a period of 3--4 years. Work is already being conducted on renovating the Verkh-Issetskiy, Severskiy, Nizhneserginskiy, Kushvinskiy, and a number of other plants in Sverdlovsk Oblast.

In a number of cases it is more advantageous to carry out a complete renovation of the fixed capital and not to create a brand-new infrastructure

in connection with new construction projects. Therefore, it hardly makes sense that the national-economic feasibility of renovation, and hence also the economic limits of the outlays to be implemented, should be determined by the coefficients of renewing the fixed capital, acknowledged, and properly so, as those which should regulate the amounts of the projects being planned. Such a method of evaluating the scope of renovation has presupposed, to a considerable degree, a not quite correct judgment on the fact that the so-called negative aspects of renovation are connected with a high coefficient of renewal of the assets. But in fact its effectiveness is frequently diminished because of bureaucratic confusion and lack of order, when "hot" new construction projects have been allocated funds which were earmarked for the intensification of production. Also influential is the fact that in the past, prior to the adoption of the decree of the CPSU CC and the Council of Ministers dated 12 July 1979 on improving the economic mechanism, in a portion of the contracts concluded with the sub-contractors and general-contracting organizations, as well as in supply and financing, the new construction projects were under more favorable conditions than the enterprises already in operation.

An important characteristic of investment policy at the present-day stage consists in the fact that retooling and renovation of production are carried out in accordance with targeted programs, formulated at the national-economic level, within the framework of large-scale plans, and on sectorial scales. Such programs assume the greatest importance at enterprises where the foundation of the plans has been laid, reflecting the requirements for material and financial resources. The new solution of USSR Gosplan and USSR Gosstroy relative to the specific make-up of projects for retooling and renovation will allow us to coordinate the points of view of the ministries and the enterprises in working out plans for the technical development of the sectors involved, and within their framework individual plans for retooling and plans for renovation. Prior to this, however, the necessary coordination was lacking, and in most cases the plans for the technical development of sectors proved to be unwieldy and cumbersome.

The effectiveness of the programs for retooling and renovation depend to a large extent on the solution of the following basic organizational problem: who should carry out such projects? At present under the conditions of planning existing production and new construction as an integrated whole in the five-year plans provisions have been made for working out balance-sheets and calculations for utilizing the existing production capacities, composite plans for renovation and retooling so as to ensure enterprises with material resources and capacities. It appears, however, that this does not exhaust the solution of the problem. We need special sub-divisions within the system of the basic construction ministries and in the USSR Ministry of Installation and Special Construction Work, which would engage only in retooling and renovating existing enterprises. The following circumstances convince us of their feasibility.

In the first place, working out balance-sheets of the capacities of construction and installation organizations as a whole for a region, territorial-industrial complex, on the scale of large urban conglomerates ought to be carried out from unified methodological points of view. Unfortunately, there is still no generally accepted method for calculating the utilization of production capacities in construction. The method developed in 1980 by the NIIES /Scientific-Research Institute on Construction Economics/ of USSR Gosstroy, in conjunction with the Moscow Construction-Engineering Institute imeni V. V. Kuybyshev, for calculating the use of production capacities of construction and installation organizations (trusts), as adopted by the USSR Gosstroy as provisional, is not lacking in shortcomings. Its utilization for balance-sheet calculations of the capacities of construction subdivisions in formulating the five-year plan is dubious. In places where long-range plans have been developed for large-scale construction programs, despite operations being constantly conducted on retooling and renovating existing enterprises, tension may arise in the balance-sheet of the specialized capacities. The following, far-from-simple problem must be solved: determining the priority of facilities to be included in the plans for the operations of construction and installation organizations and the feasibility of creating new, specialized capacities. This will take quite a bit of time, inasmuch as we need carefully worked-out grounds for the planned variants of construction and renovation, as well as the choice among them of the optimal and least capital-consuming variants. In the large regions and industrial complexes comparisons must be drawn up between the outlays for creating new capacities of the general-contracting subdivisions of the principal construction ministries and the losses which the national economy could suffer resulting from a shortage of the existing capacities.

In the second place, the construction and installation organizations, particularly the general-construction trusts, have not manifested interest in working on renovating existing enterprises, inasmuch as this is less material-consuming and the outlays of manual labor are greater. The productivity of builders is declining by an average of 30--35 percent, while the over-expenditure of wages amounts to 20--40 percent. Therefore, the industrial ministries have been creating their own contracting organizations, the capacities of which are often as great as the large trusts of the construction ministries.

In 1980 USSR Gosplan established for organizations conducting the renovation of existing enterprises a corrective coefficient (1.08) for the indicator of development. By way of an experiment the Glavzapstroy of the USSR Ministry of Construction has adopted coefficients which take into account the change in the development and labor consumption of work at existing enterprises in relation to new construction projects and pertaining to the contracting organizations with regard to specific groups of wages. Many years of experience have yielded positive results. The volume of work on renovation in the production programs of construction organizations has substantially increased.

However, the broad-based dissemination of the system of corrective coefficients requires very careful preparation. In order to avoid serious

miscalculations, we need, in our opinion, coefficients which take into account the specifics of renovation in various different sectors. Based on this, it would be feasible to introduce differentiated norms of labor outlays, wages, overhead expenses, and expenditures connected with the use of construction vehicles and machinery in the basic types of operations. But this presupposes a considerable amount of processing of the accumulated statistical information and the appropriate summarization, on the basis of which specific proposals could be made for a final solution, coordinated with USSR Gosplan and USSR Gosstroy.

The intensification of production necessitates the implementation of all its reserves, and such possibilities do exist. Experience in retooling and renovating existing enterprises has revealed new organizational methods for shortening their deadlines, and these methods deserve attentive study. We are talking about the conduct of such operations by the enterprises' own efforts. The traditional opinion about the non-effectiveness of the self-help [independent] method of operations cannot be accepted without objection, inasmuch as it is directed at mobilizing internal production reserves. Experience has shown that the creative initiative of enterprises is an important and frequently the deciding condition for the high degree of effectiveness in renovating existing production facilities. In places where this is paid attention to great successes have been achieved.

Thus, in Sverdlovsk Oblast, by means of the retooling and renovation of enterprises by their own efforts the briefest possible time was required to achieve an additional output of 1 billion rubles, along with a saving of approximately 460 million rubles of capital investments. The use of the self-help method in the textile and light industries of Ivanovo Oblast permitted an increase in production output by 853 million rubles, and most importantly, its increase was achieved in a period of 1--2 years, whereas by means of new construction this would have required at least 5 years. Other regions have also had positive experience in applying the self-help method.

As a rule, at such enterprises operations are well organized, and the interaction of all the involved services are well coordinated. The general-construction operations within a radical renovation are carried out by the departments of capital construction. In order to carry out the programs of retooling and renovation of facilities on a sector-wide scale, the construction sub-divisions have been increased. For example, in Ivanovo Oblast the number of workers in the construction departments of factories amounted to 4--6 percent of the total number of employees. Installation, start-up, and adjustment operations at enterprises are carried out in most cases by the services of the departments of the chief mechanic and the chief technologist. But sometimes the foremen of the existing workshops and highly skilled fitter-repairmen are also drawn into this work. The forms of providing incentives for their work are interesting. Thus, in the process of retooling the workshops of the country's largest woven-goods production facility, the Benderskiy Silk Combine, the director ordered the introduction of a provision for the piecework payment of start-up and adjustment operations carried out by skilled workers on their own time. Estimates were drawn up,

outlays of time were determined and evaluations made. Skilled specialists were drawn into the start-up and adjustment of equipment, moreover, those responsible for its day-to-day operation, and a high quality of work was endured. For the fitter-repairmen job-authorizations were formulated where, opposite each type of operation a deadline for its completion was established and the quality was evaluated by means of a special scale. For an assignment completed by the deadline with an evaluation of "fine" they received a 30-percent supplement to their wages.

Moving up the deadlines is not the sole plus factor of enterprises engaged in retooling or renovating existing production lines by their own efforts. There are objective reasons which justify the use of the self-help method. The fact of the matter is that the structure of the territorial, specialized installation, start-up, and adjustment organizations of the USSR Ministry of Installation and Special Construction Work does not always correspond to the specifics of the production facilities being served. Frequently they are not too familiar with the characteristics of the equipment to be installed as a replacement for obsolete equipment, they are not responsible for the quality of the work, and they drag out its time periods. The plant services must do a great deal over again.

At large enterprises the departments of the chief mechanic and the chief technologist are fully staffed with skilled specialists who are able to cope with complex technical decisions. For example, the group of engineers at the Nizhnetagil'skiy Metallurgical Combine proposed a technology--new in principle--for processing wheels, and this permitted the elimination of the previously planned second phase in the renovation of the wheel-rolling workshop with the goal of increasing production output and effect a savings of 30 million rubles in capital investments. At the Krasnoural'skiy Copper-Smelting Combine imeni S. Ordzhonikidze during the process of retooling the workshop engaged in producing double-granulated superphosphate a process of neutralizing the double-powdered superphosphate was implemented for the first time in Soviet practice. As a result of introducing this new technology, more than 2 million rubles worth of equipment was freed up, productivity was doubled, and the number of workers was curtailed. Interesting solutions have been adopted at textile industry enterprises in Moldavia. Here they have abandoned the traditional scheme for installing equipment with the aid of an anchor-type bracing attachment. After the dismantling of the obsolete equipment, felt pads soaked in special glues are laid down on the empty spaces, and the machines are placed on them; after 12 hours they are put into operation. As a result of this, the deadlines for installation have been shortened, and outlays have been reduced to 1/5 of what they were before.

Originality of the plans and precision of the engineering calculations--such are the qualitatively new traits of the present-day self-help method. Therefore, the retooling of production lines, where custom-built equipment is not involved, is often more profitably conducted by one's own efforts. Moreover, all the operations are conducted in a comprehensive manner and at a time which is suitable for the enterprises concerned. Such a method is particularly effective where the nature of "guest brigades" can be imparted in associations to the special sections which have accumulated experience in retooling. It is very important that at the decisive moment of completing work on the existing

capacities at one enterprise within the framework of an association there be the possibility of preparing them at another one.

The method of using one's own efforts is basically used in working out planning-and-estimate specifications particularly in places where the specifics of production provide for the output of non-standard equipment. Large enterprises prepare plan specifications not merely for the needs of retooling and renovating existing production facilities but also for exploratory operations. For example, the Moscow First State Bearing Plant created about 20 models of automatic units for monitoring and sorting the parts of bearings; such models are used for the manufacture of monitoring automatic units for the country's entire bearing industry. Experience has shown that at large enterprises the design bureaus develop such specifications at least as well as the planning organizations. It is becoming obvious that the creation of progressive plans for retooling and renovating existing production lines is impossible without the active participation of the leading plant specialists.

Meriting our attention here is the practice of conducting renovation by the efforts of repair-and-construction organizations, which were created in due course at a number of ministries and departments for the capital repair of buildings and other structures. An important characteristic of their activity is their retention of the rights of a general contractor. They carry out all of the construction operations, drawing upon sub-contractors for installation, start-up, and adjustment of the equipment, as well as performance of the electrical, sanitary-engineering, ventilation, and other work. Thanks to the repair-and-construction sub-divisions, we have often been able to learn ahead of time about gaps in the plan assignments with regard to putting into operation facilities being renovated, when the principal contracting ministries have been at fault.

The feasibility of using repair-and-construction organizations in renovation is conditioned by a number of factors. In the formation of their capacities, in addition to facilities engaged in the basic activity, consideration is given to housing construction for the enterprises under the sectorial departmental jurisdiction, as well as a portion of the amounts of work on renovating the existing production facilities at the expense of state capital investments and de-centralized sources of financing. Consequently, from the point of view of potential possibilities, the repair-and-construction organizations possess reserves of capacities. Some of them are quite well equipped technically. Furthermore, the capital repairs which they carry out on buildings and other structures at existing enterprises are close in their nature to renovation. It is particularly important that no special measures with regard to providing incentives for their work are required.

The inclusion within the plans of the repair-and-construction sub-divisions of projects involving renovation has created the conditions for the fullest and most even possible utilization of material and labor resources. Experience has testified to the fact that in organizations which are also engaged in renovation the per-capita output is greater than in those

organizations which carry out only the capital repairs of buildings and other structures. Moreover, they are much more profitable.

In our opinion, the repair-and-construction sub-divisions in a number of regions could be consolidated so that capital investments would not be diverted into the formation of new capacities of construction-and-installation organizations. The chemical industry also has large-scale repair sub-divisions which carry out comprehensive services. Their structure has been extended to include the capital repair of the basic technical equipment. The Tsentrkhimremontstroyontazh Trust provides services to more than 60 enterprises of this sector. The capital repairs of equipment which they perform have facilitated the considerable improvement in the basic economic indicators.

In consolidating the repair-and-construction sub-divisions it is important to create the possibility of utilizing their services for enterprises of those ministries and departments where there are no analogous organizations and where their formation is not feasible. What we are talking about here is the fact that in a number of regions, if one takes into consideration the inter-sectorial specifics of the production facilities, the repair-and-construction organizations would have a handicrafts type of nature. Experience with such inter-relationships has been accumulating. For example, the Ministry of the Electrical Equipment Industry, having at its disposal powerful trusts for repairing buildings and other structures, provides services to enterprises of other ministries and departments besides its own, while at the same time it utilizes the services of these other enterprises.

Repair-and-construction sub-divisions which are engaged in operations on renovating existing enterprises must be supplied with the necessary materials to the same extent as the specialized organizations. But in most cases they are provided with such materials after the centralized supplying of the new construction projects. This noticeably reduces the effectiveness of their activities.

Raising the technical level of production depends to a large extent on the financing of the expenditures to be carried out. Until recent times the sources of financing measures with regard to technical progress were combined in the following two groups: centralized, concentrated in the USSR Stroybank, and de-centralized--in the USSR Gosbank. Included within the sources for financing de-centralized capital investments were funds for the development of production, loans from USSR Gosbank, deductions for capital repairs, funds for consumer goods, development of new equipment, development of local industry, and other special funds, as well as budgetary funds. In the course of retooling and renovating their production facilities, enterprises were compelled to make application to both banks, and this created difficulties in providing a smooth continuity to the financing. There was a prevalent opinion that the effective renewal of the production apparatus was possible only by means of centralized capital investments. But the

de-centralized sources of financing, and, above all, the funds for production development, did not play a decisive role.

In 1977 the new procedure for financing capital investments was introduced, aimed at intensifying production. Their division into centralized and de-centralized was abolished. Now all financial resources are concentrated in the USSR Stroybank. Actual and continuing sources have been defined. It has been established that for financing retooling and renovation enterprises should make use of funds for production development and credit. The role of credit has grown particularly. If a facility has been included in the plan, the enterprise can obtain funds regardless of its estimated cost; moreover, credits are issued on the entire aggregate of measures directly at the local branch of the USSR Stroybank.

At the present time instead of a multiplicity of documents the basis for granting loans is a single credit agreement between the customer and the branches of USSR Stroybank. The credit agreement ensures the uninterrupted financing to enterprises which are carrying out operations with regard to retooling and renovation ahead of the deadlines. The amortization of the credit is accomplished primarily by means of the funds for production development. Consequently, the effectiveness of financing retooling and renovation depends to a large extent on the level of utilization of the given funds and their total amount.

The strictly targeted expenditure of funds is a task of top-priority importance. Unfortunately, this is not observed in practice. What we are talking about here is the procedure whereby, along with amortizing the indebtedness on the bank loans, accounted for in the centralized fund of the ministry, top-priority is given to deductions for the repair and construction of motor-vehicle roads; moreover, sometimes their proportion amounts to 35--45 percent of the funds for production development.

The norm of outlays for local needs, as provided for in the amount of 0.2 percent of the sales volume, obligates the enterprises to regularly make such deductions. According to the existing statute, they are formed from several sources, including from the fund for production development. But, as practical experience has shown, the latter is basic. Within the total amount of funds allocated by the ministries and departments for local needs, the amounts from the given fund comprise 80--85 percent. The situation which has taken shape is not quite a normal one. As a rule, the funds of production development are not enough to finance retooling and renovation, and the enterprises are compelled to accept credits. At the same time considerable funds are being expended from the fund for production development on goals which have no direct relationship to a higher technical level for the enterprises.

In order to finance the repair and construction of motor-vehicle roads, we obviously need a source formed by means of deductions from profits; moreover, this should not be at the level of the enterprises but rather at the level of the ministry. This would allow us to take into consideration the

characteristics and, in each specific instance, the real conditions of the activity of enterprises, their possibilities at the given stage to conduct the necessary deductions.

In considering the fund for production development as the principal source of financing the retooling and renovation of existing enterprises, we must, in our opinion, change the principles of its formation. Practical experience has shown that often it does not ensure the conditions for the simple reproduction of fixed capital assets, not to mention an expanded one. Preparation of new norms for deductions to be assigned to the fund for production development will take up quite a bit of time, inasmuch as an enormous amount of statistical materials must be processed before well-grounded solutions will be found for various sectors of industry. At the present time it is extremely important not to weaken the given fund by deductions below the existing norms. This applies particularly to the practice of amortization deductions. Frequently the degree of obsolescence of the fixed capital assets proves to be decreased; the change in the proportion of their active and passive portions is not always taken into account.

The particular characteristic of the credit method of financing is manifested in the active participation of the banking controls in speeding up the putting of capacities into operation. Herein lies one of the goals of the new procedure for financing the retooling and renovation of existing enterprises. Moreover, the facts testify that not always are loans, obtained for the technical improvement of production, utilized effectively. The proportion of equipment in credited outlays for production is still not large. Now USSR Stroybank has published directives which oblige its branches to render all possible aid to enterprises for retooling and renovation. At the same time they obviously also need to grant the right to require that top priority be given to replacing obsolete equipment. In order to evaluate the loans to be given out, the bank branches calculate at the level of the sectors the average indicator of the effectiveness of credit to fixed capital. In order to strengthen banking controls over the use of loans, it is feasible to determine this indicator on the enterprise level also, inasmuch as the average sectorial indicator does not always reliably reflect the specifics of the sub-sectors. Moreover, it is necessary to determine the effectiveness of credit for fixed capital assets for the retooling and renovation of existing enterprises, based on data regarding the actual production output, rather than deriving them from calculated data, as is done in the existing practice of deduction.

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Raise Effectiveness of Investment, Reequipment

Moscow FINANSY SSSR in Russian No 4, Apr 83 pp 46-48

[Article by N. I. Belyayev, manager of the Sverdlovsk Oblast Office of Stroybank: "Increase the Effectiveness of Capital Investments in Renovation and Retooling"]

[Text] Production renovation has been a characteristic phenomenon in recent years for many enterprises of the Central Urals. Analysis of the economic results derived from renovating existing enterprises during the 9th and 10th Five-Year Plans has shown its feasibility and effectiveness. During the 9th Five-Year Plan capacities introduced during the course of renovation produced industrial output worth more than 1.1 billion rubles. Savings on capital investments, as compared with outlays for new construction, amounted to 600 million rubles, while the average time period required for the facility to pay back on its investment was less than two years. During the 10th Five-Year Plan the renovated enterprises obtained a 77.6-percent increase in the volume of production output, and 500 million rubles of capital investments were saved.

Renovation and retooling at many enterprises in this oblast increased labor productivity. At the Pervoural'skiy New-Pipe Plant, after the renovation of Mill 30-102, an increase of capacity was achieved in turning out 250,000 tons of thin-walled, seamless pipes. Some 70 million rubles of capital investments were saved, labor productivity rose by 74 percent, while the production cost was reduced by 4.3 percent; there was also a reduction in the expenditure of metal, fuel, and electric power. During the years 1979--1980 renovation of the converter workshop of the Nizhne-Tagil'skiy Metallurgical Combine imeni V. I. Lenin provided an increase in output amounting to 1,603,000 tons, a reduction of the specific capital outlays per ton of steel being produced--as contrasted with the norm under new construction--by 18.6 rubles, and an increase in labor productivity amounting to 6.1 percent. Savings on capital investments comprised 29.8 million rubles, and the period during which the outlays were paid back amounted to six years, as compared to a norm of 8.6 years.

During the 10th Five-Year Plan a great deal of work was performed on retooling the Sverdlovsk Worsted Combine. Installed here were 371 units of new technical equipment at a cost of 9.6 million rubles. The new P-76-IG 1 M and the Vifama spinning machines freed up an area for installing the Autosuk automatic reeling units. The slubbing-and-twisting workshop has now been equipped with new slubbing (RZ-16) and twisting (KSh-83-1 TM) machines, while the packing department has carried out a comprehensive mechanization of its transport operations. The introduction into weaving production of the STB-2-175 shuttle-less looms has increased labor productivity by a factor of 1.7 and has reduced noise in the shop. Now operating in the finishing production are the new Khirano-Kinzoku carbonization units and the Tekstima drying-tentering, thermo-stabilization machine, produced by the GDR. As a result of all this, the volume of production at the combine, as compared with 1975, has increased by 8.2 percent, while the labor productivity has grown by 13.1 percent.

Under the leadership of the oblast party organization a targeted, comprehensive program has been planned for developing the national economy of this oblast in the 11th Five-Year Plan; an important place herein is occupied by renovation and retooling. This program has been drawn up for enterprises, sectors, cities, rayons, and oblasts as a whole. The pilot developers are the Ural Promstroyniiprojekt and the Institute of Economics of the UNTS [Ural Scientific Center] of the USSR Academy of Sciences.

The implementation of the targeted program will improve the structure of capital investments. According to preliminary calculations, their effectiveness, as compared to the 10th Five-Year Plan, is doubling. Industry plans a growth in labor productivity by 11.1 percent. The growth of output as a result of renovation and retooling of individual operating industrial enterprises will increase up to 71.9 percent.

This program provides for the renovation of facilities at the Nizhne-Tagil'skiy Metallurgical Combine, the Pervoural'skiy New-Pipe Plant, the Kirovogradskiy Plant, which manufactures hard alloys, the Ural'skiy Polimerkonteyner Plant, the Sverdlovsk Plant producing industrial rubber goods, etc. Thus, lying ahead during the years 1984--1985 is the renovation of the first phase of the rail-beam workshop of the Nizhne-Tagil'skiy Metallurgical Combine, which is supposed to yield an increase in beam output by 150,000 tons, an increase in labor productivity--by 8.5 percent, a reduction of specific capital investments per ton of output increase--from 42 to 39 rubles; the outlays for renovation will be paid back in 3.3 years.

Some 32.4 million rubles of capital investments are being assigned for the retooling of the Uralmash Plant. It will encompass practically all the basic workshops. In mechanical-assembly production the replacement of obsolete equipment by more improved units, comprehensive mechanization, and the curtailment of manual labor will permit the freeing up of 1,087 persons, savings of 280 tons of metal, and a reduction of production cost by 1.97 million rubles. The annual economic effect from the retooling measures will reach 1.49 million rubles. More mechanical items will begin to be turned out: with respect to rolled equipment--by 2.7 thousand tons, sintering equipment--by 1.6 thousand tons. In metallurgical production, thanks to the replacement of equipment and other measures with regard to retooling, an expansion has been provided for the output of steel castings by 1.5 thousand tons, cast iron--by 600 tons, forgings from cast iron--by 1.4 thousand tons, stampings--by 400 tons; there will also be savings of 2,233 tons of metal, a reduction in labor consumption by 345,000 norm-hours, a reduction in the production cost--by 892,000 rubles, etc. In welding production the output of metal structural components will be increased by 3,974 tons.

The Stroybank Oblast Office is exercising monitoring controls over the execution of this program. Particular attention is being paid to increasing the effectiveness of the investments. Analysis has shown that in 1981 definite successes were achieved. The proportion of capital investments in the renovation and retooling of existing enterprises amounted to 38.7 percent of the total volume of capital investments in the construction of production facilities. This level was close to the targeted program which was provided and it substantially facilitated the increased effectiveness of the investments. Here are some eloquent examples.

At the Saldinskiy Metallurgical Plant renovation was completed in 1981 on Rolling Workshop No 1 with a capacity of 350,000 tons of finished pipe per year. The specific capital investments per ton of output amounted to 35.2 rubles, as compared to 80 rubles with new construction; there was a saving of

15.7 million rubles. At the Uralmash, when the No 1 Unit was renovated, a capacity of 1,300 tons of mechanical items was introduced. The specific capital investments per ton were equal to 860 rubles, as contrasted with 3,300 rubles in the case of new construction; the economic effect was expressed in the sum of 3.18 million rubles. After the renovation in 1979--1980 of the Bogdanovich--Tyumen Railroad Line the economic effect derived from reducing investments in rolling stock and the weight of freight on the wheels was expressed in the sum of 22.8 million rubles, current expenditures were reduced by 640,000 rubles, and the relative number of workers freed up was 39 persons. There are also good indicators as a result of renovation and retooling at the Pervouralskiy Mining-Equipment Plant, the plants of Uralgidromash, Sysertskiy Electrical-Equipment, and other enterprises of the oblast.

However, studies conducted by the bank have also shown a number of unsolved problems. It is obvious that we need a comprehensive approach to renovation and retooling. They should encompass not only the basic but also the ancillary sub-divisions, the rear-line areas of production. Thus, for the renovation of the Uralmash three times as much funds were allocated during the 10th Five-Year Plan as during the 11th Five-Year Plan. However, insignificant sums were utilized for modernizing the metallurgical production facilities which are considered to be auxiliary. Moreover, it is precisely the breakdowns of metallurgical production, where the working conditions are hard, the technology is backward and the equipment physically worn out--it is precisely here that the feverish activity of consolidation is to be felt today more and more tangibly.

Inter-sectorial proportions of development are not always observed in the process of renovation and retooling. We can cite the example of the capacities of the oxygen-converting workshop of the Nizhne-Tagil'skiy Metallurgical Combine after radical renovation were not fully utilized due to the fact that the converters did not have enough vanadium cast iron. Required to increase its output is more preparatory raw material, which is being supplied by the Kachkanarskiy Mining and Ore-Enriching Combine; here the construction of the No 2 Sintering Factory was not coordinated with the final goal. The following is another example. The Verkh-Isetskiy Metallurgical Plant imeni V. I. Lenin dragged out for a long time its mastery of the new workshop for cold-rolling transformer steel, since at the Chelyabinskiy Metallurgical Plant they had not mastered the output of semi-fabricated items on time and with the necessary quality. In order to avoid losses, it is necessary to be more careful in planning the renovation of the basic and auxiliary production facilities, as well as those of the related enterprises. Research studies have shown that a quite sufficiently intensive introduction of new fixed capital assets in the industry of Sverdlovsk Oblast (the coefficient of their renewal reached 10 percent) was accompanied by an insignificant removal of obsolete and physically worn-out equipment (the coefficient of removal was 2 percent). As a result, 26 percent of the equipment, which is at a lower level than up-to-date equipment, is now being used by half of the workers, while the newly introduced, progressive equipment is not being utilized at full capacity because of a personnel shortage.

In order to increase the effectiveness of capital investments in the renovation and retooling of existing enterprises, the bank studies the technical-economic indicators of the construction projects, checks up on the quality of

the planning-and-estimate specifications, and makes proposals with regard to curtailing the estimated cost of construction. During the 10th Five-Year Plan the latter was reduced by more than 40 million rubles, while in 1981 this figure was almost 14 million rubles. The technical-economic indicators of enterprises to be renovated are also studied constantly. The bank examined the technical-economic justification for renovating Mill 220 in the No 1 Pipe-Rolling Workshop of the Pervoural'skiy New-Pipe Plant (the general planner was the Uralgiprommez Institute), and it proposed that the cost be lowered by 3.88 million rubles, after excluding expenditures which did not pertain to the given renovation. The USSR Ministry of Ferrous Metallurgy accepted this proposal and approved a TEO /technical-economic justification/ in an amount of 113.7 million rubles, in contrast to the previous 117.9 million rubles. As a result, the specific capital investments per ton of output produced decreased from 317 to 314 rubles, while the profitability increased from 12.3 to 12.5 percent.

Guided by the directives of the USSR Srobybank Administration, the oblast office and branches in examining the plans pay persistent attention to the top-priority thrust of investments in renovating and retooling existing enterprises so that the facilities may be introduced within the specified time period. Check-ups on the plans for capital construction, the title and internal-construction title lists are organized prior to the bank's receipt of these documents so that at the stage of their preliminary examination, prior to their being approved and coordinated, problems can be solved on the spot with the customers and the contractors, or they may be submitted for examination by the appropriate organizations. The bank exercises constant monitoring controls over the correctness of the relegation of facilities to new construction projects, expanded ones, renovated ones, and construction projects on which measures are being taken for retooling in accordance with the procedure established by USSR Gosplan and Gosstroy.

Check-ups have established the fact that, at a number of enterprises, simultaneously with their renovation their expansion is being carried out; moreover, the proportion of construction and installation operations within the total estimated cost amounts to between 50 and 90 percent with the predominance of work being devoted to the expansion of the enterprises. In studying the materials of the check-ups, the bank proposed to the customers that they put in order the title lists of the construction projects, being guided by the fact that the growth of enterprises' capacities by means of their renovation or retooling yields the most effective end-results.

The office is improving its work along these lines. For example, the renovation of the workshop engaged in making reinforced-concrete structural elements at the Beloyarskiy Structural-Element Plant of the Uralenergostroy Trust was inaugurated in accordance with planning-and-estimate specifications worked out with consideration being given to the proposals of the office for a capacity of 40,000 cubic meters of structural elements per year, instead of the previously intended structure of a new plant with a capacity of 15,000 cubic meters of structural elements for highway construction. With practically the same amount of funds the capacity of the existing

enterprise will be doubled in comparison with new construction. In accordance with the bank's proposal with regard to the assignment of the RSFSR Ministry of the Construction Materials Industry, adjustments have been made in the engineering blueprints for expanding the Krylosovskiy Lime Plant and for increasing its capacity from 350,000 to 800,000 tons of powdered lime per year instead of the new construction of the Staroutkinskiy Lime Plant. The adjusted economic effectiveness amounts to approximately 4.5 million rubles.

The bank's oblast office and branches have strengthened their controls over the presence and the make-up of the plans worked out by the production associations and enterprises for retooling for the purpose of the proportional development of facilities both of basic production and auxiliary production. The condition of the fixed capital assets of existing enterprises is studied. Having discovered obsolete and worn-out equipment, in order to speed up its removal, we make the appropriate proposals concerning the allocation of the necessary capital investments to replace it with new, more productive equipment.

The work conducted by the bank is called upon to increase the effectiveness of the investments in the renovation and retooling of existing enterprises, to facilitate the execution of the comprehensive program for the development of the national economy of Sverdlovsk Oblast in the 11th Five-Year Plan and--as a final result--the growth of the effectiveness of social production.

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Need for Retooling, Reconstruction

Moscow EKONOMIKA STROITEL'STVA in Russian No 5, May 83 pp 3-7

[Article by L. A. Bibin, first deputy minister of construction of the USSR: "Pay Particular Attention to Renovation and Retooling"]

[Text] At the 26th CPSU Congress it was emphasized that we need to direct capital investments, in the first place, into renovating and retooling existing enterprises. Funds allocated for these purposes are reimbursed significantly more rapidly than when analogous production capacities are created by means of new construction, and the requirement for labor resources is reduced. Taking this into account, during the 11th Five-Year Plan capital investments in renovating and retooling existing enterprises have grown by 21.2 percent in comparison with the 10th Five-Year Plan.

The November (1982) Plenum of the CPSU CC demanded an increase in the proportion of renovation and modernization of existing enterprises and, at the same time, that the number of newly begun industrial construction projects be curtailed.

Such a trend in capital construction is the result of the changing conditions for the further development of the national economy. At a considerable

portion of enterprises, particularly those which were built many years ago, the equipment and technology have become obsolete. Scientific and technical progress requires an improvement in the technology of production, and it compels us to find for these purposes more progressive types of engineering equipment, along with new ways to increase labor productivity. And this can be aided to a large extent by conducting the renovation of enterprises in a timely manner.

Another reason compelling us to give preference to renovating industry is the considerable gain in outlays of time, labor, and funds which are provided by renovation and retooling of enterprises in comparison with new construction. By means of carrying them out we may more quickly put into operation additional production capacities for turning out up-to-date products with less specific capital investments and the reimbursement of these investments within a briefer time period. The renovation of existing enterprises allows us to implement the mastery of the growth of production capacities, as a rule, without increasing the number of workers, engineers, and technicians at the expense of the labor groups which have been formed at the enterprises and which represent experienced operational personnel. And this is of decisive importance.

As is known, during the present five-year plan the numerical growth of the labor force in the national economy will be extremely insignificant as compared with the 10th Five-Year Plan. Meanwhile, the newly built enterprises require new workers; moreover, in many cases this is occurring in sparsely inhabited regions with a lack of housing, social and cultural facilities, sources of energy supply, railroad and motor-vehicle transportation, etc. In the case of renovating existing enterprises these difficulties are absent, and this creates great socio-economic advantages for renovation as compared with the new construction of analogous facilities.

Yet another circumstance is of no small importance. The creation of new industrial enterprises is connected with a significant reduction in the area of arable lands. For example, the construction of the Kamskiy Motor-Vehicle Plant Complex required about 1,000 sq. km of territory, a portion of which had been utilized as arable land prior to this.

The feasibility and economic effectiveness of carrying out the renovation of existing enterprises are confirmed in the following examples also.

The sequentially conducted renovation of the Kirovskiy Plant in Leningrad encompassed all its production lines. At this enterprise the engineering structures were almost completely rebuilt, while the underground and above-ground utility lines were overhauled. In place of certain old, low, and dimly lit workshops of the enterprise, a single, large, contemporary type of building was constructed. Thus were erected the main tractor, welding, rolling, tractor-servicing, and other workshops. Within approximately a year after plant renovation had begun, series production began on the new, heavy-duty K-700 tractors, and in the following year--the still more powerful K-701 tractors. Interlocking the parts of buildings to be retained with the newly

constructed ones allowed us to obtain an economic effect of more than 1 million rubles; moreover, the custom-built 900/680 rolling mill was put into operation half a year ahead of the deadline which had been set. This allowed us to obtain an additional 52,000 tons of high-quality rolled metal.

The plan for renovating the Krasnyy Treugol'nik Rubber-Footwear Plant, as worked out by the Rezinoprojekt Institute of the Ministry of the Chemical Industry, provides for the replacement of obsolete equipment and the retooling of the entire enterprise. As a result of this plant's renovation, the volume of production will increase by 81 million rubles. In order to carry it out, approximately 13 million rubles of capital investments are required, including 10 million rubles for equipment, which constitutes about 77 percent of the total outlays. To build a new enterprise with such a production volume would require 43 million rubles, including 15 million rubles for equipment, the proportion of which would amount to 35 percent in the total outlays. Renovating this enterprise will save approximately 30 million rubles of capital investments, including 5 million rubles for the cost of technical and auxiliary equipment. A considerable economic effect will also be achieved by means of utilizing the production and ancillary buildings which already exist at this enterprise, the administrative and everyday-service areas, the power-engineering, transportation, and other facilities.

The examples cited above convincingly affirm the high degree of effectiveness of renovation in further developing the country's production forces and increasing its economic potential.

Proceeding from the particular importance of the most rapid possible renovation of the existing enterprises, the USSR Ministry of Construction is carrying out a broad front of operations with regard to renovating enterprises located in the Leningrad, Gorkiy, Yaroslavl, Kalinin, Ulyanovsk, and other oblasts of the RSFSR, as well as in Lithuania, Latvia, Uzbekistan, Moldavia, and Georgia. The proportion of the volume of construction and installation operations being carried out by the ministry with respect to renovating existing enterprises is growing every year, and at the present time it comprises more than one-third of the ministry's annual program.

The largest amounts of work on renovating existing enterprises are being carried out at the present time by the Glavzapstroy of the USSR Ministry of Construction; its annual program amounts to more than 0.5 billion rubles. A significant place therein is occupied by industrial construction. Approximately 80 percent consists of operations involved with renovating and expanding existing enterprises. Such a high percentage of the necessity for renovating enterprises is explained by the fact that Glavzapstroy is entrusted with all the industrial construction in Leningrad and its oblast, where many enterprises were built decades ago and require renovation.

The renovation of existing enterprises is being conducted in Leningrad along the following two lines. These are the partial reconstruction of individual workshops, with a renovation of the equipment in order to eliminate bottlenecks in production at an existing enterprise, and the sequential, comprehensive reconstruction of an enterprise's production units, with the

creation at the site of the obsolete workshops of new ones meeting all the contemporary requirements.

Predominant in Glavzapstroy's practice is the second, comprehensive line in carrying out renovation. This line requires new, progressive solutions in organizing construction production, the introduction of comprehensive mechanization and advanced technology for performing construction and installation work, ensuring increased labor productivity and work quality under the conditions of the enterprise renovation being conducted.

Last year the Leningrad Production Construction and Installation Association of Glavzapstroy successfully carried out its annual program of contracting operations; it accounted for most of the volume of operations with regard to renovating Leningrad enterprises.

Fulfilling its annual plan for construction and installation operations by 102 percent was the Daugavpilsskiy Trust of the LaSSR Ministry of Construction, having put into operation after renovation capacities at the Daugavpilsskiy Chemical [i.e., synthetic] Fiber Plant. Fine results were achieved this past year by Trust No 3 of the Georgian SSR Ministry of Construction in renovating the enterprises of the Tbilisi Silk-Production Association, where the plan was fulfilled by 105 percent. Good work is also being done on renovating existing enterprises by the LiSSR Ministry of Construction, which completed within the established deadlines and put into operation after renovation the Kaunas Furniture Combine and a number of other enterprises.

Nevertheless, there are quite a few examples where the plans for renovation have not been fulfilled. Thus, in 1982 Trust No 3 of the Georgian SSR Ministry of Construction fulfilled its annual plan for the renovation of the Tsentrolit Plant of the Machine Tool and Tool Building Industry in Tbilisi by only 90 percent because of weak preparations for the work and delays in freeing up the area under the construction. Trust No 5 of this same ministry last year did not fulfill its plan for expanding the Batumskiy Chemical-Pharmaceutical because of the lack of readiness on time of the workshops to be renovated. Trust No 1 of Zakavkazmetallurgstroy did not fulfill its plan for two months of the current year because of insufficient readiness for work on renovating the Rustavskiy Chemical Fiber Plant of the Ministry of the Chemical Industry and also because of the delays in vacating the area from the existing equipment. And quite a few such examples could be cited.

The fundamental principles for the successful solution of problems which arise during the conduct of renovation and retooling were set forth in the decree of the CPSU CC and the USSR Council of Ministers, dated 12 July 1979 and entitled "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality." This document points out carefully and specifically that renovation and retooling of existing enterprises constitute one of the leading trends in construction. They must be carried out on the basis of the five-year plans to be worked out by industrial enterprises, ministries, and departments. Such plans, unfortunately, have not been worked out, and their lack in most cases has led to the late freeing up by the enterprises of the workshops subject to renovation from

the existing equipment and, consequently, to delays in presenting an operational front for the construction organizations. Great influence on this would be exerted by a statute on the responsibility of clients for delays in freeing up the workshops and construction areas to be renovated from equipment, but up to now such a statute has not been worked out. This inflicts serious harm to the conduct of renovation.

The non-fulfillment of plans for construction and installation operations in renovating existing enterprises also requires that other measures be taken. It is undoubtedly true likewise that the construction organizations must pay more attention to the questions of ensuring the renovation of enterprises than has been the case up to now. There are reserves for improving work on renovating existing enterprises.

Quite a bit has been accomplished in recent years to improve the state of affairs with regard to the renovation of industrial enterprises. Corrective sectorial coefficients have been introduced to the existing estimate norms for construction and installation operations in renovation, large scope has been provided for overhead expenses for construction organizations which are carrying out these operations, and bonuses have been increased for putting capacities into operation at renovated enterprises. Construction and installation organizations in whose plans the volume of operations on renovation and retooling of enterprises amounts to 50 percent and more are permitted to allocate higher wages to one group of leading workers, etc.

Nevertheless, despite the solutions which have been adopted, construction organizations in many cases are very unwilling to undertake the renovation of existing enterprises. The fact of the matter here is that, despite the privileges which have been introduced, the reimbursement to the builders of the actual outlays for operations on renovating enterprises is not being fully carried out. In renovating existing enterprises there is a significant increase in the labor consumption of construction and installation operations. It has been computed that in renovating, for example, ferrous-metallurgical facilities it increases, as compared with the YERER /unified rayon integrated evaluations/ for earthmoving operations, by a factor of 2.3, for the installation of reinforced-concrete structural components--by a factor of 2.15, for bricklaying--by a factor of 1.69, and in roofing installation--by a factor of 1.35.

Large losses are borne by the builders because of the delayed freeing up of the workshops to be renovated from equipment. The client is frequently not in a hurry to present a front for operations. Meanwhile, time is passing, the workers stand idle, but they must be paid. For example, it is often the case that an excavator operator, working under the conditions of an existing enterprise, digs pits under the footings for equipment or ditches for laying out new utility lines with many stoppages, since the territory of an enterprise is usually filled with pipelines and cables, compelling him to often stop the operation of the excavator. These stoppages lower the production of the workers and, consequently, their wages as well, and they delay the completion of many other operations. As of now, it is the case

that all the additional expenditures for renovation, and there are quite a few of them, are borne only by the contracting organization.

In the renovation of enterprises there also exist such problems as the impossibility of using within the workshops being renovated such equipment as hoisting cranes and earthmoving equipment, which the construction industry has at its disposal. In new construction there is nothing to hinder them, but in renovating enterprises such insurmountable obstacles emerge as insufficient height of the rooms, congestion, which, in many instances, compels the workers to have recourse to the use of shovels, hand-operated winches, telpher lines, block-and-tackle, things which, as is known, do not increase labor productivity.

Also to be observed in the conduct of renovating existing enterprises are shortcomings of a purely organizational nature. The preparations for conducting the renovation of an existing enterprise are significantly different from the preparations for new construction. What is needed here are very well-thought-out plans for labor organization and plans for production operations, taking into account the characteristics of the enterprise to be renovated; these must be worked out by the planners and trusts of Orgtekhsstroy. Moreover, it should be said that the success of a renovation, for example, that of the Izhorskiy Plant in Leningrad, is determined, to a large extent, by a good plan for the production operations, such as that drawn up by the special group of workers at Glavzapstroy.

In our opinion, it is necessary to draw up an all-embracing standardized statute on the conduct of renovating and retooling existing enterprises. This statute should include a carefully thought-out and thoroughly worked-out, wide circle of questions, solvable on a unified methodological basis, such as the preparation for production of construction and installation operations and methods for carrying them out, a procedure for providing the contracting organizations with planning-and-estimate specifications, material and technical resources, construction vehicles and machinery, the conditions and scope of employing strict economic sanctions for violating the agreed-upon conditions for compensating damages imposed on the contractor, etc. In this document, which must be approved by the established procedure and become mandatory for use, we must define the role, the measure of participation, and the responsibility for carrying out the renovation and retooling of existing enterprises of the construction ministries and departments, as well as the ministries and departments acting as clients, USSR Gosplan, USSR Gosstroy, USSR Goskomtrud, and USSR Stroybank.

A timely solution is also required for the problem of organizing the production of compact and sufficiently productive construction equipment for use in renovating existing enterprises.

It is undoubtedly true that retooling, i.e., the replacement of individual types of equipment and even engineering lines in existing workshops, which does not require the renovation of buildings and other structures, can and must be carried out by the efforts of the enterprises themselves.

In order to increase the interested concern of construction organizations in the most rapid possible conduct of operations involved in renovating existing enterprises, it would be feasible to continue work on improving the system of corrective coefficients to the estimated cost of construction and installation operations to be carried out under complex and crowded conditions of construction areas. Improvement in this matter would undoubtedly be facilitated likewise by a solution of the problems connected with increasing the salaries of the line-type engineers and technicians employed on projects for renovating existing enterprises, as well as increasing the sizes of bonuses for piecework job authorizations for every percentage point of normative time reduced; we should also increase the maximum size of the bonuses awarded to a single worker, as computed on the basis of his piecework earnings per month.

We must also solve the problem of a significant increase in the amount of reserve funds for unforeseen projects and outlays to be included in the objective estimates for the renovation of existing enterprises. Practical experience in working on the renovation of enterprises has shown that the established norm of reserve funds for unforeseen projects and outlays is insufficient.

The importance and great significance for the entire national economy of carrying out the renovation and retooling of existing enterprises, among which are included quite a few very large and extremely important enterprises, requires that particular attention be paid to improving the organization at them of the production of construction and installation operations by construction organizations, ministries, and departments, as well as the most rapid possible solution of all problems which are delaying the conduct of renovating and retooling enterprises at the present time.

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Retrofitting, Bank Credit

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[Article by P. D. Podshivalenko, professor: "Retrofitting and Bank Credit"]

[Text] An extremely important task in the present-day phase of building communism is the universal increase in the effectiveness of social production and the quality of all work. It is necessary to carry out a decisive conversion of social production to an intensive path of development.

An important trend in solving this problem is the considerable expansion of the scale of retrofitting and renovating existing enterprises, re-outfitting them with new, highly efficient equipment, introducing progressive technology along with the scientific organization of labor and production.

Every year approximately 20 billion rubles are allocated for retrofitting and renovating existing enterprises. In accordance with the State Plan for the

for the Economic and Social Development of the USSR in 1983, 1.1 billion rubles more will be utilized for these purposes than was provided by the five-year plan, a figure amounting to 23.9 billion rubles.

The data on the reproductive structure of capital investments during the last few years testify to the fact that, albeit slowly, the specific proportion of outlays for retooling and renovation is increasing. Thus, in 1979 some 37 percent of the total amount of capital investments in industry was allocated for new construction, 30.2 percent--for retooling and renovating existing enterprises, 28.6 percent--for expanding existing enterprises, and 4.2 percent--for supporting the capacities of existing enterprises; in 1981 the corresponding figures were 36.4, 32.9, 26.5, and 4.2 percent. For the period 1981--1985 an increase of capital investments for these purposes has been provided in the amount of 21.2 percent--this is more than double the growth rate for all capital investments according to the state plan.

Expenditures for retooling and renovation pay for themselves on an average of three times faster than in the case of creating analogous production capacities by means of new construction. Moreover, the time periods required for putting capacities into operation are reduced, the need for manpower is lessened, and the level of return on investment increases by a factor of 1.5.

A factor of no small importance in favor of retooling and renovation is, furthermore, the need to avert unproductive outlays due to the operation of obsolete and physically worn-out equipment. At the present time the age structure of the equipment in basic production is characterized by the data cited in the table.

	Proportion of equipment in basic production (in %) with service life		
	Less than 10 years	From 10 to 20 years	20 years and more
For the national economy as a whole	66	27	7
Including for the leading machine-building sectors as follows:			
Ministry of Power Machine Building	62	24	14
Ministry of the Machine Tool and Tool Building Industry	60	29	11
Ministry of Tractor and Agricultural Machine Building	62	27	11
Ministry of Machine Building for Animal Husbandry and Fodder Production	74	21	5
Ministry of Construction, Road and Municipal Machine Building	62	31	7

In the ferrous metallurgical enterprises more than 40 percent of all the equipment has been in operation for over 10, 20, or even 40 years. Matters are no better in the coal industry, a number of branches of the building-materials industry, and at many enterprises in the sectors of Group B.

It must be borne in mind that, if in the past the service life of equipment amounted to 20--25 years, now it has been reduced by a factor of 2--3, and the artificial prolongation of the service life of equipment, including that which is obsolete, delays the introduction of the latest achievements of scientific and technical progress; it also worsens the indicators of the production and financial activities of associations and enterprises. Therefore, we must not simply restore or replace outmoded machines with new machines of the same type, but use more up-to-date ones, meeting the present-day requirements of science and technology.

One of the trends in retooling is the furnishing of enterprises with new equipment. During 1981 alone 322,600 measures with respect to new equipment were carried out (the introduction of progressive technology, equipment, and computers, mechanization of production, mastery of new types of industrial output, modernization of existing equipment, etc.). From the introduction of the measures enumerated above the additional profit amounted to 1.4 billion rubles, the annual economic effect was 3.1 billion rubles, the number of employee vacancies saved amounted to 205,600, and the actual outlays for introducing the measures regarding the new equipment turned out to be 12.7 percent less than the estimate.

According to the data of the USSR Central Statistical Administration, in 1981 enterprises of the industrial ministries and departments installed 1,894,000 units of equipment, including 1,671,000 units of new equipment. The proportion of new equipment within the total amount installed during 1981 at enterprises of the machine-building ministries amounted to 80--97 percent.

Retooling facilitates the increase in the proportion of outlays for equipment within the technical structure of capital investments: during the 9th Five-Year Plan it was equal to 40 percent, during the 10th Five-Year Plan--45 percent, and during the first two years of the 11th Five-Year Plan (calculated data)--48 percent.

It must be noted, however, that, despite the presence of a large amount of obsolete equipment, the ministries and departments allocate a predominant part of the equipment being delivered (more than 60 percent) to newly constructed enterprises and facilities. This testifies to the fact that in many sectors they still retain the orientation toward increasing production capacities by means of building new enterprises and expanding existing ones (65.6 percent in 1979 and 64.9 percent in 1981).

The technical structure of capital investments in machine building, as used in retooling and renovation, is considerably better than for industry as a whole. Thus, in carrying out these measures, the machine-building ministries during the years of the 10th Five-Year Plan directed into the passive portion

of the fixed capital assets only 15 percent of the capital investments, whereas during the 11th Five-Year Plan they plan to lower them to 13 percent. In this case they will be slightly more than three times less than for productive construction in the national economy as a whole. In individual ministries the proportion of outlays for construction and installation operations has provided for a considerably lesser amount. For example, in the Ministry of Instrument Making, Automation Equipment, and Control Systems it is supposed to comprise 9 percent, the Ministry of the Electrical Equipment Industry--10 percent, the Ministry of Tractor and Agricultural Machine Building--11 percent, and the Ministry of Chemical and Petroleum Machine Building--12 percent. Consequently, the proportion of equipment within the technical structure of capital investments, directed into retooling and renovating machine-building enterprises, has reached 80--85 percent. This leads to an increase in the economic effectiveness of capital investments: in the aggregate for all the sectors of the socialist economy the growth in the specific proportion of equipment of only 1 percent yields, as it were, a "cost-free" increase in production output from the very same amount of new production assets of approximately a billion rubles.

As analysis has shown, retooling is proceeding in machine building at an outstripping pace. And this is as it should be according to principle: it thereby ensures the necessary prerequisites for solving this problem in all the other sectors of the economy.

During the 10th Five-Year Plan retooling (not counting renovation) received from the leading machine-building ministries 10.1 billion rubles, or 36.4 percent of the total amount of capital investments in production-type facilities, whereas this figure was only 19 percent for the national economy as a whole. Furthermore, in such ministries as the Ministry of Instrument Making, Automation Equipment, and Control Systems 70 percent was allocated for these purposes, Ministry of the Machine Tool and Tool Building Industry--57 percent, Ministry of Machine Building for Light and Food Industry and Household Appliances--54 percent, Ministry of Construction, Road and Municipal Machine Building--51 percent, and Ministry of the Electrical Equipment Industry--48 percent of all capital investments. The predominantly intensive forms of renewing fixed capital assets in the machine-building sectors have also been retained in the current five-year plan.

The predominance in the total volume of capital investments in machine-building sectors of the proportion of outlays for retooling is one of the decisive reasons for the outstripping pace of labor productivity in many of its sectors, as compared with its growth for industry as a whole. If for industry as a whole labor productivity in 1982, as compared with 1981, increased by 2.1 percent, in power-engineering machine building this figure was 10 percent, chemical and petroleum machine building--8 percent, machine-tool building--7 percent, instrument making--7 percent, construction and road machine building--7 percent.

And, in contrast, in those sectors where the proportion of retooling not only did not grow but even decreased labor productivity increased not so substantially or even decreased. For example, in light industry it increased by

only 0.6 percent, in power engineering by 0.7 percent, whereas in the petroleum industry it decreased by 1 percent, in the coal industry by 0.2 percent, in ferrous and non-ferrous metallurgy by 0.3 percent.

Outlays for retooling have a source of financing which has strengthened them--the fund for production development.

Measures with regard to mechanization and automation, the replacement and modernization of equipment, improvement of production organization and labor, as well as other measures for the retooling of production lines, to be carried out by means of the above-mentioned fund, are worked out and approved independently by the production associations (or enterprises). In accordance with the calculations and proposals of the production associations (or enterprises), they are included in their full amounts in the plan of capital construction of the ministries and departments, and they are provided by them in the top-priority procedure, subject to the necessary limits on capital investments and contracting operations, material and other resources (within the limits and funds established for the appropriate ministries and departments within the five-year plans and with a distribution by individual years). In order to promulgate measures the necessity for which arises during the course of fulfilling the annual plan, the appropriate outlays may be made above the limit for the state capital investments by means of the unused amounts from the fund for production development and the above-plan deductions for this fund. In case of the insufficiency of the fund for financing the outlays planned by the associations or enterprises, the necessary amounts are granted to them in the form of long-term credit to be paid back at the time of reimbursement of the capital investments.

During the 10th Five-Year Plan the total sum of credit for retooling existing enterprises exceeded 5.5 billion rubles. By means of credit 7,229 measures were carried out; as a result of their production, the annual production output increased by 5.07 billion rubles, while profits increased by 116.5 billion rubles.

In 1981--the first year of the 11th Five-Year Plan--USSR Stroybank granted credit to 964 enterprises, where 915 measures were carried out. Analysis of the results of 430 measures testifies to the following significant economic effect: the annual production output increased by 513.8 million rubles, additional profits increased by 31.3 million rubles, and there was a decrease in the conventional employment vacancies amounting to 13,900. The overall size of the production outlays constituted 630.5 million rubles, of which 47.5 percent were covered by credit.

As practical experience testifies, measures with regard to retooling existing enterprises carried out by means of banking credit in most cases are completed by the deadline or ahead of time. During the 10th Five-Year Plan and during the first years of the 11th Five-Year Plan the proportion of such measures accounted for more than 87 percent. But for industry as a whole slightly more than 40 percent of measures for retooling were completed by the deadlines or ahead of time.

However, the proportion of credit in the outlays for retooling existing enterprises is not large: on an average for the national economy it is equal to 8.2 percent, while for machine building it is as much as 30 percent. The presence among a majority of the enterprises of their own sources, which are sufficient for them to conduct retooling and renovation, and the possibility of redistributing their own resources within the bounds of the ministries and departments does not permit an active utilization for these purposes of credit with its control functions. It should be noted that the amounts of the fund for production development of enterprises after a specific part of them are allocated for financing outlays with regard to retooling are underutilized from year to year. During the 10th Five-Year Plan 11--15 percent of them remained inertly at the end of the year on the accounts of the industrial enterprises.

Further intensification of production on the basis of retooling and renovation of existing enterprises requires the solution of a number of pressing problems.

Despite the fact that the time periods for carrying out measures for retooling existing enterprises are 25--30 percent less than in new construction or expansion, on the average they are still sufficiently large and frequently amount to 4--5 years. One of the reasons for this lies in the fact that operations on retooling are carried out primarily by the self-help method. In our opinion, it would be more feasible to have these operations performed by the general suppliers of the equipment.

At the 26th CPSU Congress it was pointed out that the machine-building enterprises ought to ensure the delivery of complete sets of equipment with a high degree of plant readiness, perform the installation as well as the start-up and adjustment operations, and the turnover of this equipment to the customers. Carrying out the delivery of the complete sets of the equipment and its installation by the manufacturing plants increases their interested concern in the end-results, and it increases the responsibility for the on-schedule and complete delivery of equipment to the construction projects. And the end-product of machine building, moreover, will be equipment which is manufactured and prepared under plant conditions for installation, assembled and tested at the site of use. Experimental check-ups on the method under consideration at a number of enterprises under construction have confirmed its effectiveness.

In 1977 the CPSU CC approved the experience of the Ministry of Chemical and Petroleum Machine Building, which made the transition to providing construction projects with complete sets of technical lines, playing the role of general supplier. This ministry supplies the enterprises under construction fully with complete sets of equipment at a high state of plant readiness, including apparatus, machinery, and tools produced by the associations and enterprises of other ministries. The average annual economic effect in the national economy, thanks to the delivery of complete sets of equipment, exceeds 200 million rubles. However, calculations between the customers and the suppliers of equipment are conducted not for a complete set but for each individual element included in it; the supplier plants take into consideration the products sold and count the funds of economic incentives regardless of whether or not the sets of items are complete or the equipment has been installed.

On the questions of delivering and installing equipment practical experience has also set forth other interesting initiatives. As a particular example of this, we can cite the unit-block method of construction, whereby a contracting organization assembles equipment in blocks, then delivers them to a construction site and installs them on previously prepared foundations. Deserving of attention is the experience of the Pervomayskiy Machine-Building Plant imeni 25 October, which carries out work at the consumers' sites on installing, starting up, and adjusting the diesel engines which it turns out; it also provides capital repair, current maintenance, and other services for their operation. The Sumskoye Machine-Building Association imeni M. V. Frunze produces and assembles in blocks compressor units and by its own efforts installs them at construction sites. Herein there is no longer any need to construct major buildings, the time periods required to assemble the compressor stations are three times briefer, and capital investments are 40 percent less, as compared with other similar units.

Such an organization of operations would be particularly effective in the case of retooling enterprises, a retooling to be carried out by the efforts of the plants which are supplying the equipment. The latter may be granted the right, in case of necessity, to draw upon specialized construction and installation contracting organizations for performing work in the capacity of sub-contractors. Similar methods of supplying, installing, and turning over equipment for operation are practiced by Soviet organizations in rendering technical assistance to foreign countries.

It would be completely justifiable to create in this country industrial-construction associations (firms), to be formed at the centers of machine-building plants; they would not only turn out new equipment but would also assemble it at new construction sites and enterprises being expanded; they would also ensure the putting into operation of capacities, the technical servicing of the basic production assets put into operation during the process of their use. Nor would we exclude the possibility of creating associations (firms) on these same principles for work on retooling.

There also seems to be a genuine possibility for industrial-construction associations (firms) to turn over equipment at enterprises built, expanded, or renovated by them for leasing to interested industrial production associations (at first by way of experiment), bearing in mind that leases could prove to be more effective in comparison with the presently existing practice of levying budget payments for the funds. In equal measure this could be practiced likewise by those suppliers of equipment who perform operations with regard to retooling existing enterprises.

The re-structuring in the indicated directions and others similar to it of the organizational forms of carrying out construction should, in our view, affect most of all the retooling of existing enterprises. One of the consequences of this would be the expansion of the part played by credit in financing these operations.

If we introduce the above-mentioned principles of organizing work with regard to retooling, then there inevitably arises the necessity for extending

credit to machine-building plants (associations, firms) for their outlays on the deliveries of equipment and for unfinished construction prior to the turning over of facilities for operational use. The proportion of credits in these expenditures exceeds 80--85 percent, as has been shown by the experience of introducing calculations into the commercial production of construction output. Moreover, the amounts of the funds for production development prior to the completed projects being turned over to the customers would become a source of resources for obtaining credit. As before, long-term credit would supplement any insufficiency in these funds. Thus, controls with the aid of credit would be exercised both over the activity of the suppliers as well as over the activity of the customers; this would undoubtedly facilitate the strengthening of its influence on the fulfillment of the plans for retooling--one of the decisive conditions for the growth of labor productivity.

Analysis of economic practice enables us to draw a conclusion concerning the feasibility of utilizing a proportionate share of the amortization deductions, earmarked for capital repairs, for retooling with a reduction of outlays for repairs (approximately 32 billion rubles were expended in industry alone for these purposes during the 10th Five-Year Plan). Limiting the poorly effective capital repairs will enable us to raise the technical level of existing production, to reduce the need for additional manpower and material resources. And indeed at present in those sectors of the national economy to which equipment is being delivered there is an operative system of repair enterprises, one of the tasks of which is to manufacture spare parts. It is a well-known fact that the assemblies of new machines have parts which are highly complicated from a design and engineering point of view. Therefore, the repair plants and workshops have been equipped with complete sets of the newest machine tools. But this does not guarantee an avoidance of handicraft type of work in manufacturing spare parts. It has been calculated that 3--4 times as much labor is expended on manufacturing parts by this method than at specialized machine-building enterprises engaging in large-serial production, not to mention the factor of diversion of the machine-tool stock.

It is also necessary to take into account the fact that, in order to produce spare parts, the repair enterprises are utilizing structural metal instead of special stampings, and this is bringing about an enormous over-expenditure of materials. It is understandable that it would be much more economical to have the delivery of spare parts made by the plants which are the manufacturers of the machinery and equipment. However, the need for spare parts is being satisfied by the machine-tool industry by only 10--15 percent, while their specific proportion in the total amount of this branch's output amounts to no more than 3--5 percent. For every worker employed in producing equipment and machinery, three workers are required to carry out their repairs.

As a result, the capital repairs in industry require outlays which exceed the total of annual capital investments in machine building by 20--22 percent.

In the USSR Ministry of Ferrous Metallurgy the outlays for capital repairs on machinery and equipment in 1982 exceeded the amount of capital investments in retooling by 57 percent, in non-ferrous metallurgy--by 26 percent, in the petrochemical industry--by 37 percent, in the building-materials industry--by 71 percent. With regard to many types of equipment, the expenditures for capital repairs, carried out during the course of the entire service life, considerably surpass their initial cost. Moreover, after capital repair, as a rule, the original technical and economic indicators of the existing machines are not restored. For example, the physical durability of metal-cutting machine tools is reduced by 10--15 percent, while their productivity is reduced by 5--10 percent. Meanwhile, the calculations of specialists and economic practice both in our country and abroad testify to the fact that restorative repair is economically justified when the outlays on it do not exceed 25 percent of the original cost of the equipment.

In practice, more and more frequently, under the guise of capital repairs, what is actually taking place is renovation, retooling, the replacement of obsolete equipment with new equipment which meets the requirements of scientific and technical progress. It may be said that such a type of "violation" reflects the process of the replacement of moribund methods of restoration and partial modernization by other, more effective ones.

Obviously it is high time that we recognize the need to pause for a while over the example of the above-mentioned limit of equipment wear, at which it is feasible to carry out the capital repair of equipment and machinery, as well as to add the amortizations totals which are freed up in connection with this to the fund for production development for utilization in retooling. It would be feasible to transfer the repair plants, organized within the ministries, and which have acquired the implements of labor, basically to the supply-ministries, having transformed them into stations (bases) for servicing by means of suppliers the equipment which has been assembled and put into operation at the consumers' facilities.

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BUILDING MATERIALS

NEED FOR STRICT COST ACCOUNTING IN CEMENT INDUSTRY STRESSED

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[Article by V. S. Karelin and M. S. Barlyayeva, candidates of economic sciences, NIIitsement [State All-Union Research Institute of the Cement Industry]; All-Union Advanced Training Institute for Managerial and Engineering-Technical Personnel, USSR Minstroyaterialy [USSR Ministry of the Construction Materials Industry]: "Avenues of Improving Cost Accounting at Cement Industry Enterprises"]

[Text] The "Basic Directions of Economic and Social Development of the USSR in 1981-1985 and the Period Up to 1990" state: "To develop and strengthen cost accounting in every way on the basis of five-year plan assignments and long-term economic norms...To strive for increased profitability, the elimination of production at a planned loss and higher profits primarily through lower prime cost, higher labor productivity and improved product quality...To improve the forms of cost accounting relations...."

Enterprises and production associations in the cement industry have amassed considerable experience working under cost accounting conditions. This experience should be assimilated and widely disseminated in a number of instances. The "Regulations on Organizing Intraplant Cost Accounting at Cement Industry Enterprises," which were developed at NIIitsement*, are the basis for introducing cost accounting.

Practice has shown the basic possibility and necessity of using these Regulations since they draw upon the experience of leading enterprises in the cement industry (the Serbyakovskiy Plant, the "Voskresensktsement" Production Association, the "Novorostsement" Combine, and others). But certain corrections should also be made in these Regulations. While for production units belonging to associations (combines), it is necessary to continue to plan profit on the basis of intraplant planned accounting prices and to distribute funds among production units (plants) according to their economic performance and their contribution to the common effort of an association (combine), there is no need to plan these indicators for plant shops and the material incentive fund should be distributed among shops according to existing regulations governing bonuses.

*A. N. Lyusov, V. D. Golubkov, V. I. Dubovitskaya, I. V. Postovskaya, and L. I. Vishnevskaya took part in the development of the Regulations.

Given the integrated quality control system, the main [performance] indicator of enterprises should be output corresponding to plant standards which can be highly differentiated for individual products.

The raising of the level of planning at the enterprise is one of the basic directions of improving intraplant cost accounting. The revision of indicators used to evaluate [the performance of] structural subdivisions should be considered among the first measures in this direction.

Thus the number of indicators established for the basic shops under the new planning conditions could include the normative net output indicator for evaluating the performance of the basic shops. This would make it possible to assign them more realistic labor productivity targets, which would play a positive role to a certain degree for the enterprise as a whole.

The normative net output indicator of shops in auxiliary production (power shops and machine-repair shops) should be calculated for the part of their output that is produced for outside customers.

Under the new planning conditions, the production cost indicator [sebestoimost'] plays a significantly greater role. The implementation of a number of measures to improve the norming of the use of raw materials, supplies, fuel, energy and other resources promotes the realistic, substantiated determination of the costs of individual subdivisions. We must devise norms for spare parts used in routine repairs for each type of production equipment and norms governing the expenditure of auxiliary materials in basic and auxiliary shops.

The improvement of accounting and accountability of subdivisions and especially the accounting of production costs is very important for the development of internal cost accounting. Therefore, we must develop a normative method of accounting and require the accounting personnel and the norm setters of shops to keep records on individual items of shop production costs.

The conversion of the auxiliary shops of cement plants to cost accounting is a very important and complex matter. After all, almost 50 percent of the production personnel of an enterprise work in these shops. However the Regulations did not sufficiently elaborate questions pertaining to the conversion of the given shops to cost accounting operation.

The indicators that are usually planned for the auxiliary shops are: the volume of work or output, the wage fund and the estimate of shop costs (or production costs in various kinds of work). But the indicator of quality of work and services performed is clearly lacking).

Intraplant prices on the goods and services of auxiliary shops should be elaborated at the level of the shop's planned production costs (without profit in any form) thereby making it possible to use these prices in the cost accounting system. In the given instance, planned intraplant accounting prices on goods and services can be used by the accounting department

to charge the costs of the auxiliary shops against the client shops [tsekhi-zakazchiki] thereby making it possible to eliminate (without special calculations) the influence of fluctuations in the cost of services (a factor that is beyond the control of the client shops) on the cost accounting performance of intraplant subdivisions.

The accounting department must charge the deviation between the actual and planned costs of auxiliary shops to the client shops in proportion to the amount charged against them as deviations from planned prices. These costs are not considered in the determination of the cost accounting performance of intraplant subdivisions.

It is most difficult to convert repair shops to cost accounting operation because of the great diversity and number of operations and services performed by them, the considerable percentage of unplanned work, some of which must be performed while the enterprise's equipment is in operation.

It is especially important for this group of shops to secure a high level of quality in their repair work thereby making it possible to lower costs substantially and to make more effective use of fixed productive capital with a smaller number of auxiliary workers.

The articulation of a clearly defined program of activity for the repair shops (schedule) is a necessary condition to making timely organizational, technical and material preparations for the performance of repair work at a high level of quality and the lowest possible cost.

The basic data used to compile monthly, quarterly and annual work schedules for auxiliary shops are:

- (1) the schedule for the preventive maintenance of fixed capital and the norms governing the expenditure of supplies associated therewith;
- (2) the plan for the introduction of new technology;
- (3) orders from other subdivisions in the plant for work to be performed or items to be fabricated (client shops must submit work orders to auxiliary shops between 2 and 3 months in advance of the planned period);
- (4) the capacities of auxiliary shops.

The filing of orders 2-3 months in advance should allow enough time for design work, for organizational and technical preparations, for securing the supplies needed to fill the orders, and for estimating the cost of the work. The work schedule of the auxiliary shop usually reserves 10-15 percent of its time for emergency, unanticipated orders.

The cost of work and services is usually determined by the planning office of the repair shops. Accordingly, costs are compiled for every type of product and service. The components of these costs are: supplies, basic and additional wages, and social insurance withholdings.

Shop and energy costs are reckoned in percent of the wages of basic production workers which are determined on the basis of the annual planned estimate of the repair shop's production costs.

The estimated cost of work and services is coordinated with the client shop, is approved by the enterprise's chief engineer or chief economist and is then entered in the intraplant planned price manual. Followup orders for products or services within a year are calculated in already confirmed prices.

In view of the numerous, unique jobs and services performed by repair shops, some enterprises have instituted a planned shop production cost in norm-hours for each skill group and type of work. The cost of materials and energy as well as shop costs are calculated in percent of the wages of the basic production workers (based on the annual planned costs of the repair shop).

Small jobs and services performed by repair shops for other shops are calculated in norm-hours in agreement with the client shop.

Since the quality of the work performed is very important in evaluating the level of activity of the repair shops, it is advisable to establish the responsibility of these shops to client shops. Sanctions for inferior work are determined in accordance with losses actually sustained by client shops or according to the following formula:

$$M = (C/\Delta) \cdot T,$$

where M is the sum of sanctions for low-quality repair work; C is the cost of repair work performed; Δ is the planned period between repairs (days); and T is the time the machine is not operated before the scheduled repair period (days).

The same method can be used to calculate additional payments for improving the quality of repair work and for increasing equipment and fixed capital operating time between repairs.

The existing intraplant cost accounting at cement plants for the most part ensures the effectiveness of the activity not only of individual shops but also promotes the high performance of the enterprise on the whole.

The most important direction in the development of cost accounting at the present time is its incorporation in the activity of production associations (combines) and of lower levels of management--brigades and shifts.

There are 13 production associations and combines in operation in the cement industry of the USSR Ministry of Materials today. Their share in the overall number of cement enterprises is 14.1 percent; they account for 30.7 percent of cement output.

Analysis of the existing system of internal cost accounting in the "Volstsement," "Bryansktsement" and "Voskresensktsement" production associations and in the "Novorostsement" and Amvroziyevskiy combines showed that it differs significantly from the cost accounting system at plants because most of the production associations were created on the basis of formerly independent enterprises that lost their rights as a juridical person upon joining an association. Enterprises (production units) belonging to an association are a part of the same production complex and work on the common task of selling cement and other products in fulfillment of other key plan indicators assigned to the association as a whole.

The majority of the cost accounting regulations created in production associations are based on the "Regulations on Organizing Intraplant Cost Accounting at Cement Industry Enterprises" developed by the NIItsement but have been supplemented and reworked with regard to the specifics of the status of the production unit, the refinement of planning indicators and the work experience of production associations under cost accounting conditions in the last decade.

The following are characteristic features of cost accounting in a production association:

- (1) the establishment of normative working capital throughout the association as a whole (since supply is centralized and centralized warehouses are established) plus the establishment of responsibility for individual elements of working capital;
- (2) the planning of the system of the same indicators for production units as for the association as a whole with the exception of indicators characterizing the fulfillment of individual centralized functions in the association;
- (3) a system of economic sanctions directed toward fulfilling the plan for the delivery of products to customers, toward the observance of terms of delivery and norms governing the turnover of railway cars, and toward the effective use of fixed productive capital.

Economic performance must be evaluated and economic incentives for collectives of production units belonging to the association must be based on the fulfillment of delivery plans (with regard to mix and delivery date) in accordance with contracts and orders, the plan for raising labor productivity, the plan for improving product quality, and the cement production cost plan.

In connection with the introduction of new indicators for evaluating the performance of associations, it became necessary to develop new indicators and to introduce them to structural subdivisions.

Thus the "Spassktsement" Production Association developed a wage norm in kopecks per ruble's worth of output for structural subdivisions.

Analysis of indicators planned for cost accounting production units in the "Bryansktsement," "Spassktsement," "Mikhaylovtssement," and "Voskresensktsement" production associations attests to the absence of a unified approach

to the indicators that are planned and considered. The general shortcomings in this system are: production cost is not planned for all production units; some of them have not been assigned fixed and working capital; equipment operation indicators are not always ratified; and little is done to describe the principles and particulars in the cost accounting of production units. The best organization of cost accounting in production units is seen in the "Voskresensktsement" and "Spassktsement" production associations.

In the present stage of development of the cement industry, it is important to introduce brigade cost accounting in order to increase the interest of the working people in managing production and in producing high final results. A number of enterprises have already undertaken the organization of such cost accounting (the Serbyakovskiy, Starooskolskiy, Nevyanskiy and Semipalatinskiy plants, the Nikolayevskiy Cement-Mining Combine, and the "Mikhaylovtsement" and "Akmyantsementas" production associations).

Cost accounting at the lower levels of management of cement plants must be a natural continuation of cost accounting in the shop and the sector. The forms of lower level cost accounting may vary and their choice may depend on the organization of labor, on the planning of the volume of production and indicators for which the norms of expenditure of material, energy and other expenditures are established and the possibility of taking actual costs in the production process into account.

The basic forms of lower level cost accounting are: aggregate, shift and brigade.

Plan targets for lower cost accounting levels should be computed on the basis of work plans of the various shops and should include the following indicators.

1. The volume of production in physical terms.
2. Basic equipment operation indicators.
3. Product quality.
4. Norms governing the expenditure of supplies, fuel, energy and other resources.
5. The size of the brigade and the wage fund.
6. The cost of producing a product or semimanufacture.

The results of work and the cost of work should be considered precisely and objectively on the basis of counters, scales, measurement devices, limit cards, etc. Wherever approximate records are being kept up to now, we must install measurement apparatus (electric meters, scales for weighing raw materials and supplies, fuel gauges, compressed air gauges, etc.), keep strict records on supplies and spare parts expended in the process of current repair, rapidly worn out objects, tools, etc.

The cost accounting production cost at lower production levels should include only those expenditures that can be reduced through the careful and rational use of technological processes, i. e., expenditures, the magnitude of which can be influenced by the action of the collective of a given shift or brigade.

The increase in the volume of planning and accounting work associated with the introduction of brigade cost accounting necessitates the introduction of at least one economist-accountant position for every 2-3 shops at the enterprise.

The determination of the magnitude of the saving (overexpenditure) for each brigade or workplace, current monitoring of these indicators and the broad discussion of the results will promote the strengthening of the economy regime and the further reinforcement of cost accounting.

Conversion to cost accounting presupposes granting the right to collectives (councils) of production brigades (within the limits of the norms and means assigned to them) to determine the size of bonuses and wages to be paid for the performance of the entire brigade collective with due regard to the actual contribution of each member of the brigade to the common results of the work; to nominate brigade members for additional payments for vocational mastery and for performing more than one job; to advise the administration and trade union on changing the skill group of workers with due regard to the quality of their work; to determine winners of socialist competition within the brigade and the amount of their reward; and to nominate brigade members for material and moral rewards on the basis of the results of the intraplant socialist competition.

Such are the basic directions of further development of cost accounting in the cement industry. Their incorporation in the work practice of enterprises will substantially increase the effectiveness of economic levers and stimuli and will make material rewards directly dependent on the effectiveness and quality of the work, on the fulfillment of plant targets and the results of production activity.

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